

## CONVENTIONAL FACILITIES (WBS 1.10)

### i. Ring Tunnel and Experimental Halls

The availability of the CBA conventional facilities for use in the Relativistic Heavy Ion Collider represented an unprecedented opportunity to build the collider at minimum cost. The existing tunnel configuration provides for six experimental areas where the ring beams will cross. Four areas have been provided with the major structures necessary for an operating experimental area. The RHIC lattice will use these existing areas, which are at the 2, 6, 8 and 10 o'clock locations (see Fig. 10-1). The 4 o'clock facility was an "open area" but was enclosed with portable shielding prior to machine turn-on, and is being used for the high frequency rf system. It is also suitable for small experiments. In order to make the ring operational, the gaps at each of the two undeveloped areas - 10 and 12 o'clock - had to be closed. Multi-plate arch tunnels 4.9 m (16 ft) and 7.9 m (26 ft) in diameter have been erected at 10 o'clock, along with a service building. The 10 o'clock area is the location of the beam dump and is used for a small experiment called PHOBOS. At 12 o'clock, 4.9 m and 7.9 m diameter multi-plate arch tunnels have been erected, along with 2 concrete headwalls, 2 stair structures, a base slab and service building. Multi-plate arch magnet access tunnels have also been constructed at either side of the 12 o'clock facility. The interaction point is presently closed by portable shield blocks. This area will be available for development at a later date, thus maintaining the option of adding an experimental hall for future experimental needs. Additional multi-plate arch magnet access tunnels spurs have been constructed at either side of the 8 o'clock facility. A complete list of RHIC buildings and tunnel identification is given in Table 10-1.

The experimental halls at 2, 6 and 8 o'clock are fully enclosed structures complete with support buildings. The area and height of the facilities vary and each is equipped with overhead cranes, air conditioning, and sprinkler protection and has direct access from grade. Table 10-2 gives the dimensions, crane capacities and beam heights in each of these facilities as well as the 4 o'clock open area. The open area, as noted above, has a concrete deck capable of supporting portable shielding blocks in varying configurations. All conventional services, including a support building, are in place. The experimental hall at 6 o'clock has an assembly building addition constructed similar to the existing assembly building at 8 o'clock.

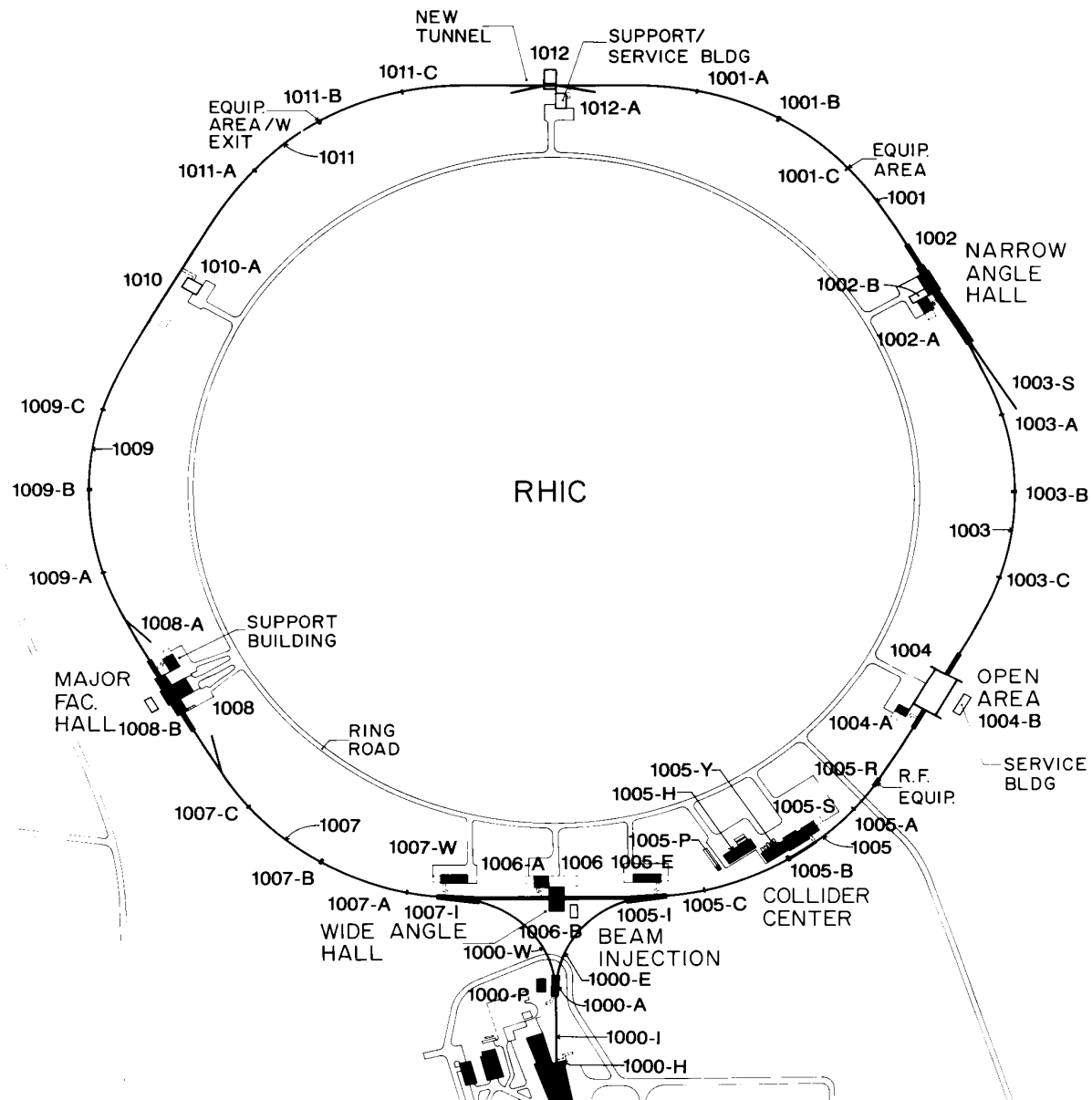


Fig. 10-1. RHIC building and tunnel identification.

**Table 10-1.** RHIC Building and Tunnel Identification

|      |                            |       |   |
|------|----------------------------|-------|---|
|      |                            | 1000A | Injection Conjunction Structure                         |
|      |                            | 1000E | East Injection Tunnel                                   |
|      |                            | 1000H | Injection Access  |
|      |                            | 1000I | Injection Tunnel  |
|      |                            | 1000P | Injection Power Supply Building                         |
|      |                            | 1000W | West Injection Tunnel                                   |
| 1001 | 1 O'Clock Sextant          | 1001A | 1 O'Clock Sextant Electronics Alcove                    |
|      |                            | 1001B | 1 O'Clock Sextant Electronics Alcove                    |
|      |                            | 1001C | 1 O'Clock Sextant Electronics Alcove                    |
| 1002 | Narrow Angle Hall          | 1002A | Narrow Angle Hall Support Building                      |
|      |                            | 1002B | Narrow Angle Hall Service Building                      |
| 1003 | 3 O'Clock Sextant          | 1003A | 3 O'Clock Sextant Electronics Alcove                    |
|      |                            | 1003B | 3 O'Clock Sextant Electronics Alcove                    |
|      |                            | 1003C | 3 O'Clock Sextant Electronics Alcove                    |
|      |                            | 1003S | 3 O'Clock Sextant Spectrometer Tunnel                   |
| 1004 | Open Area                  | 1004A | Open Area Support Building                              |
|      |                            | 1004B | Open Area Service Building                              |
| 1005 | 5 O'Clock Sextant          | 1005A | 5 O'Clock Sextant Electronics Alcove                    |
|      |                            | 1005B | 5 O'Clock Sextant Electronics Alcove                    |
|      |                            | 1005C | 5 O'Clock Sextant Electronics Alcove                    |
|      |                            | 1005E | East Injection Power Supply Building                    |
|      |                            | 1005H | Compressor Structure                                    |
|      |                            | 1005I | East Injection Transition Structure                     |
|      |                            | 1005P | Cooling Tower Pump House                                |
|      |                            | 1005R | rf Structure  |
|      |                            | 1005S | Collider Center   |
|      |                            | 1005Y | Cryogenic Structure                                     |
| 1006 | Wide Angle Hall            | 1006A | Wide Angle Hall Support Building                        |
|      |                            | 1006B | Wide Angle Hall Service Building                        |
| 1007 | 7 O'Clock Sextant          | 1007A | 7 O'Clock Sextant Electronics Alcove                    |
|      |                            | 1007B | 7 O'Clock Sextant Electronics Alcove                    |
|      |                            | 1007C | 7 O'Clock Sextant Electronics Alcove                    |
|      |                            | 1007W | West Injection Power Supply Building                    |
|      |                            | 1007I | West Injection Transition Structure                     |
| 1008 | Major Facility Hall        | 1008A | Major Facility Hall Support Building                    |
|      |                            | 1008B | Major Facility Hall Service Building                    |
| 1009 | 9 O'Clock Sextant          | 1009A | 9 O'Clock Sextant Electronics Alcove                    |
|      |                            | 1009B | 9 O'Clock Sextant Electronics Alcove                    |
|      |                            | 1009C | 9 O'Clock Sextant Electronics Alcove                    |
| 1010 | Experimental Facility      | 1010A | Support/Service Building                                |
| 1011 | 11 O'Clock Sextant         | 1011A | 11 O'Clock Sextant Electronics Alcove                   |
|      |                            | 1011B | 11 O'Clock Sextant Electronics Alcove                   |
|      |                            | 1011C | 11 O'Clock Sextant Electronics Alcove                   |
| 1012 | Future Major Facility Hall | 1012A | Future Major Facility Hall Support/<br>Service Building |

**Table 10-2.** Summary of Hall Dimensions (m)

|                         | Length          | Width           | Beam Height | Hook Height/<br>Capacity (tons) |
|-------------------------|-----------------|-----------------|-------------|---------------------------------|
| 2. Narrow Angle         |                 |                 |             |                                 |
| Central Hall            | 28              | 12              | 1.7         | 6.1/20                          |
| Forward Exp. Bldg.      | 68              | 7.9             | 1.7         | 5.3*                            |
| "Stub"                  | 91              | 2.4             | 1.0         | 2.0*                            |
| 4. Open Area            | 57 <sup>†</sup> | 29 <sup>†</sup> | 2.2         | ---*                            |
| 6. Wide Angle           |                 |                 |             |                                 |
| Central Hall            | 16              | 32              | 4.3         | 9/20                            |
| Assembly Building       | 31              | 18              | 4.3         | 12.2/40 + 12.2/10               |
| 8. Major Facility       |                 |                 |             |                                 |
| Assembly building       | 18              | 16.8            | 5.2         | 11/40                           |
| Experimental area       |                 |                 |             | 5.2/12                          |
| Forward Exp. Bldgs. (2) | 16              | 9               | 3.3         | 3.3/15                          |
| Assembly Building       | 19              | 19              | 5.2         | 11.3/40+15/5**                  |

\*No crane - ceiling height given

<sup>†</sup>Pad dimensions given

\*\*Rails installed, no crane

The Collider Center, approximately 4650 m<sup>2</sup> (50,000 sq ft), consisting of a Cryogenic Wing, a Compressor Structure and a four level Main Building, is complete. The air-conditioned main building contains technical shops, an RF/Power Supply wing, office and conference room space, and space for the collider cryogenics control center. The RHIC funding included installation of a power substation for the accelerator rf and Power Supplies Wing, site improvements such as paved access roads, hardstands, parking areas, yard lighting and general restoration of facilities and grounds. Additional power supply service buildings have been constructed at various locations around the ring. The 2, 6 and 8 o'clock service buildings are 300 m<sup>2</sup> (3200 sq ft) and the 4 o'clock building will be 450 m<sup>2</sup> (4800 sq ft). Dimensions of support and service buildings are given in Table 10-3.

Construction of the utility services, roadways, drainage and other site improvements for the CBA have been underway since 1979. All have been completed except for some paving and site work. The extension of the 69 kV substation was completed in May 1982.

**Table 10-3.** Summary of Building Dimensions (m)

| Location | Building        | Length | Width | Building No. |
|----------|-----------------|--------|-------|--------------|
| 2        | Support         | 14     | 18    | 1002A        |
|          | Service         | 24     | 12    | 1002B        |
| 4        | Support         | 14     | 10    | 1004A        |
|          | Service         | 38     | 12    | 1004B        |
| 6        | Support         | 14     | 18    | 1006A        |
|          | Service         | 24     | 12    | 1006B        |
| 8        | Support         | 14     | 18    | 1008A        |
|          | Service         | 24     | 12    | 1008B        |
| 10       | Support/Service | 15     | 27    | 1010A        |
| 12       | Support/Service | 15     | 27    | 1012A        |

The underground ductbank for electrical power and communication distribution was completed in 1981. Installation of conventional power feeder cables to the Collider Center was finished in 1982. Installation of the balance of the power cables around the Ring Road ductbank and the unit substations at areas 2, 4, 6 and 8 o'clock location was completed in the Spring of 1983. The Main Ring Sector 11 and Sector 1, approximately one-third of the enclosure, which had remained unfinished during CBA, has been provided with permanent power, lights, fire alarm, HVAC and dehumidification. The Main Ring has been completed, and the two support buildings at areas 10 and 12 o'clock have been constructed as required to supply the utility services to these areas to make the ring operational.